T test (Paired and Unpaired)

What is a t-test

- T-tests analyze the average difference between two sets
- Are commonly used with small sample sizes, when the variances of two normal distributions are not known
- A paired t-test deals with data collected from the same set
- An unpaired t-test deals with data collected between different set

When a T-test would be useful

- Paired
  - 1 group, 2 times
  - Record data from one group over two different times
    - This means the two data sets are paired through the same group
- Unpaired
  - 2 groups, 1 time
  - Record data from two groups one time
    - This means the two data sets are unpaired through two different groups

Example of paired and unpaired t-tests

- Let’s say that you want test if a certain medication increases heart-rate
- If you tested the heart-rate of a set of patients prior to the medication and after the medication and wanted to compare these data sets, you would use a paired t-test as both sets of data were from the same patients.
- However, if you tested the heart-rate of a set of patients prior to medication and a different set of patients after medication, then you would use an unpaired t-test because the patients from the two trials were different.

Assumptions made by the test

- The dependent variable is continuous
- Data sets are independent of one another (separate groups)
- The dependent variable is normally distributed (consistent scale)
- The dependent variable does not have any outliers

Class Practice Test

Stress in the Summer v. at Mass Academy

Citations

1. Paired Sample T-Test. Retrieved November 10, 2018, from https://www.statisticssolutions.com/manova-analysis-paired-sample-t-test/
2. Running a t-test in Excel [PDF]. Roger Williams University. https://www.rwu.edu/sites/default/files/downloads/fcas/mns/running_a_t-test_in_excel.pdf